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# Use of the Q-Switched Alexandrite Laser (755 nm, 100 nsec) for Eyebrow Tattoo Removal

**Gerardo A. Moreno-Arias, MD, and Alejandro Camps-Fresneda, MD, PhD***

*Department of Dermatology, General Hospital of Catalonia, Sant Cugat del Vallés, Barcelona, Spain*

***Background and Objective:*** **Permanent tattooing for cosmetic reasons has increased in recent years; as a consequence, there has been an increase of requests for pigment removal due to complications or undesired results. The Q-switched alexandrite laser has been found useful in removing black exogenous pigment, which is the most popular color in eyebrow enhancement. We report the case of a patient with black-pigment eyebrow cosmetic tattoo after treatment with the Q-switched alexandrite laser.**
***Study Design/Materials and Methods:*** **Treatment conditions included 755-nm wavelength, 100 ± 10-nsec pulse width, and 3-mm spot size. Fluence threshold was determined, and a spot test was made at the first visit. Single impact technique with 10% overlapping was applied to the whole tattoo. Five treatments were performed with a mean fluence of 7 J/cm$^2$.**
***Results:*** **Complete pigment removal was achieved after five sessions. Superficial bleeding and vesicle formation was observed.**
***Conclusions:*** **Eyebrow tattooing can be treated efficiently with the use of the Q-switched alexandrite laser when black pigment has been used for cosmetic reasons. Lasers Surg. Med. 25:123–125, 1999.** **© 1999 Wiley-Liss, Inc.**

**Key words: alexandrite laser; cosmetic tattoo; eyebrow tattoo; laser surgery**

## INTRODUCTION

Aging, epilation, and diverse pathologies may affect the eyebrow hair follicle, permanently compromising its appearance. Dermopigmentation with dark pigments (usually black) is a cosmetic technique that may be used for eyebrow enhancement. However, chemical composition, pigment instability, pigment migration, or artistic technical errors may lead the unsatisfied patient to request removal of the tattoo. In these cases, abrasion, surgical excision, and, more recently, laser treatment have become popular therapeutic approaches [1]. Although argon laser removes pigment efficiently [2], permanent hypopigmentation and scarring are common adverse effects. The Q-switched ruby (694 nm) [3], neodymium:YAG (1,064 and 532 nm), and alexandrite (755 nm) [4,5] lasers have been useful in black-pigment removal, with a few or no side effects. We describe the use of the Q-switched alexandrite laser for eyebrow tattoo removal.

## CASE REPORT

A 32-year-old white woman received a black-pigment professional tattoo on the eyebrows to camouflage partial alopecia (Fig. 1A). She claimed variation in hue some months after tattoo application and requested removal of the tattoo. Removal was accomplished with the Q-switched alexandrite laser at 755 nm, 100 ± 10-nsec pulse width, spot size of 3 mm (Candela Laser Corpora-

*Correspondence to: Dr. Alejandro Camps-Fresneda, Department of Dermatology, General Hospital of Catalonia, Gomera s/n, E-08910 Sant Cugat del Vallés, Barcelona, Spain. E-mail: gmoreno@medicina.ub.es

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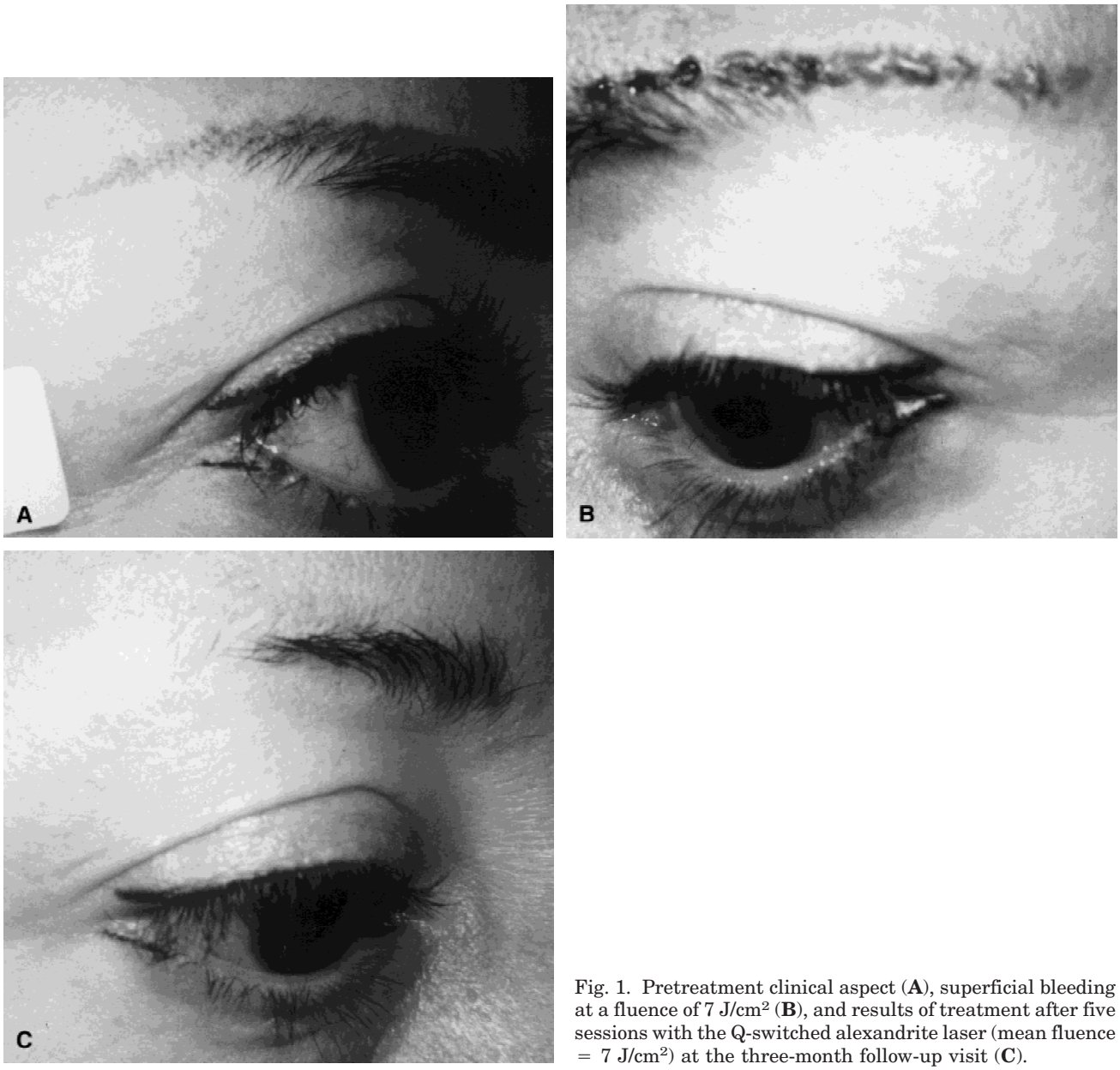


Fig. 1. Pretreatment clinical aspect (**A**), superficial bleeding at a fluence of 7 J/cm$^2$ (**B**), and results of treatment after five sessions with the Q-switched alexandrite laser (mean fluence = 7 J/cm$^2$) at the three-month follow-up visit (**C**).

tion, Wayland, MA), and fluence of 7 J/cm$^2$ in five sessions at four-week intervals.

Local anesthesia was not necessary. Once the fluence threshold was determined on the first visit, a spot test was made to assess local response to the alexandrite laser. We used a single-impact technique with a maximum overlapping of 10% until the whole tattoo was covered, and then mupirocin ointment (Bactroban®, SmithKline Beecham, S.A., Madrid, Spain) was gently applied. The patient was instructed to wash the treated area with warm water or saline solution, apply the ointment once daily for 10 days, and then switch to a sunscreen (SPF 15) until the following session. Pretreatment and posttreatment photographs were compared to assess the clinical response. Removal of all clinically visible pigment to produce an area indistinguishable from the surrounding untreated skin was defined as complete clearance. Partial removal of tattoo pigment was considered incomplete clearance.

Superficial bleeding and vesicle formation were observed during treatment, with no further repercussion (Fig. 1B). Complete removal of tattoo pigment was achieved after five treatment sessions (Fig. 1C).

## DISCUSSION

Dermopigmentation for eyebrow or eyelid enhancement is usually done with black or brownish pigments. It has been shown that black pigment has an excellent absorption coefficient and low reflectance [6], factors that determine a good response to treatment with Q-switched lasers in a few sessions. The response of lighter tones is variable. However, brownish pigments may turn black; in these cases, repetitive treatments may be necessary. Many cosmetic tattoos darken; in these cases, more sessions are also needed for tattoo removal.

The depth at which pigment is introduced by the artist is another critical issue for complete clearance with the alexandrite laser. The highest amount of pigment is located in the epidermis and dermis, and only a small amount may be found in deeper structures [7]. This circumstance enables the laser beam to reach and fragment a large quantity of pigment particles, which are gradually removed by phagocytosis or direct lymphatic drainage. Professional tattoos have shown a 50% clearance after a mean of seven treatment sessions, but traumatic and amateur tattoos may be removed with fewer treatments [8]. However, the number of sessions necessary to remove cosmetic tattoos is quite variable and depends also on pigment load. Many patients with cosmetic tattoos are not satisfied with the cosmetic appearance and frequently request retattooing with the same color or even overtattooing with another tone similar to the patient's skin color to disguise the initial tattoo.

In the present case, complete pigment removal after five sessions may be explained by the fact that most of the black pigment was located on the surface of the lesion. However, a small quantity of particles, in deeper but reachable layers, may have responded equally, an aspect that resembles more the behavior of an amateur tattoo.

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